BAMS 90
BAMH 90

ABSOLUTE MULTITURN ENCODER MyAbs

- Electronic multiturn gear
- Hollow shaft up to ø 28 mm or shaft ø 12 mm
- Shock resistant up to 250 g
- Only 50 mm clearance needed
- Easy mounting of the hollow shaft version. The encoder is mounted directly on the drive shaft without coupling.

- Multiturn up to 8192 (13 bits) resolution, 4096 (12 bits) number of furn
- SSI interface, additional interfaces include RS 485 and OEM specific protocolls
- Protection: IP 65
- optional with incremental track 2048 ppr.
- (Ex) available as explosion proof zone 2 and 22

Mechanical characteristics:

Speed:[1]	max. 6000 min^{-1}
Rotor moment of inertia:	appr. 65 x 10^{-6} kgm^2
Starting torque hollow shaft version:	< 0,2 Nm
Starting torque shaft version:	< 0,05 Nm
Radial load capacity of shaft (hollow shaft):[2]	80 N
Axial load capacity of shaft: (shaft):[2]	40 N
Weight:	appr. 0,7 kg
Protection acc. to EN 60 529:	IP 65
Working temperature:	–20° C ... +70 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	2500 m/s^2, 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s^2, 10 ... 2000 Hz

[1] for continuous operation 3000 min^{-1}
[2] at shaft version only (at shaft end)

Electrical characteristics:

Interface type:	Synchronous-Serial (SSI) with outputs
General:	
Supply voltage (U_B):	5,0 ... 30 V DC[3]
Current consumption type (no load).:	89 mA
max (no load):	138 mA
Short circuit proof outputs:[1]	yes[2]
Reverse connection protection at U_B:	yes
SSI-Interface:	
Output driver:	RS 485
Permissible load/channel:	max. +/-20 mA
Update rate for position data:	appr. 1600/s
SSI pulse rate min./max./pulse frequency:	100 kHz/500 kHz
Signal level high:	typ. 3,8 V
Signal level low (I_{Last} = 20 mA):	typ. 1,3 V
Rise time t_r (without cable):	max. 100 ns
Fall time t_f (without cable):	max. 100 ns

Control inputs:		
(V/R, SET)	Voltage:	5 ... 30 V DC = U_B
	Response time:	10 ms
	Signal level: low	max. 25 % U_B
	high	min. 60 % U_B, max. U_B
	Max. current load	≤0,5 mA

Status outputs:		
	Output driver:	Push-Pull
	max. permissible load:	±9,0 mA
	Signal level high:	min. U_B –3,0 V
	low:	max. 1,5 V
	Rise time:	max. 240 µs
	Fall time:	max. 300 µs

Incremental outputs (A/B):		
	Output driver:	RS422 compatible
	Puls frequency (max.):	200 kHz
	Signal level high:	4,5 V
	Signal level low (I_{Last} = 20 mA):	0,5 V
	Rise time (without cable):	max. 200 ns
	Fall time (without cable):	max. 200 ns

Conforms to CE requirements acc. to EN 50082-2, EN 50081-2 and EN 55011
Class B
Performance against magnetic influence acc. to EN61000-4, 5

[1] when U_B supply voltage correctly applied U_B
[2] Only one channel at a time:
When U_B = 5 V DC, short-circuit to output, 0 V and + U_B is permitted.
When U_B < 5 V DC short-circuit to output and 0 V is permitted.
[3] Please note: the minimum voltage supply must be 5.0 V DC

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MultiturnType BAMH 90 SSI or RS 485

Control inputs:
F/R input for change of direction

The encoder can output increasing code values when the shaft is rotated either clockwise or counter-clockwise (when looking from the shaft side).

The appropriate option can be selected via a hardware configuration of the F/R input BEFORE powering up the encoder.

The following table shows the function selection dependent on the hardware and software settings:

Hardware configuration of the F/R input:

Hardware configuration of the F/R input	Function: increasing code value when the shaft is in the following direction:
"low" (0 V) on the F/R input (= cw)	cw
"high" ($+U_B$) on the F/R input (= ccw)	ccw
"low" (0 V) on the F/R input (= cw)	ccw
"high" ($+U_B$) on the F/R input (= ccw)	ccw

Notes

– Any hardware configuration of the F/R input must take place BEFORE powering up the encoder!

– If the F/R input is not configured, then a 0 V configuration will apply (default condition)!

– If the direction of rotation is changed due to the F/R configuration, without activating the SET function again, and if the encoder is also then powered up again, a new position value may be outputted, even if the physical shaft position of the encoder has not moved! This is due to internal conversion processes.

The start-up procedure for the encoder should therefore follow this sequence:

1. Determine the count direction of the encoder via the F/R input
2. Apply power to the encoder
3. Activate the SET function, if desired (see SET input below)

– If using a cable wire to configure the F/R input, then for EMC reasons the wire should not remain open but should be tied either to 0 V or U_B!

– The response time of the F/R input with U_B = 5 … 30 V DC power supply is 10 ms.

SET inputs

This input is used to reset (to zero) the encoder. A high control pulse ($+U_B$) applied to this input for a minimum of 10 ms will reset the current encoder position to the pre-programmed setpoint value.

Notes

– The SET function should only be implemented when the encoder shaft is at rest.

– For the duration of the SET pulse the SSI interface does not function and therefore does not output any valid position values!

– If using a cable wire to configure the SET input, then for EMC reasons the wire should not remain open but should be tied either to 0 V or U_B!

– The response time of the SET input with U_B = 5 … 30 V DC power supply is 10 ms.

Encoder outputs[1]:

Output	Default-function
A1:	battery control*
A2:	not activated*
A3:	not activated*
A4:	not activated*

The outputs are not activated in the factory setting (default). They can be activated and defined by the factory e. g. limit switch, overspeed and temperature control etc.

[1] not available for versions with incremental track

* can be activated by factory

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MultiturnType BAMH 90 SSI or RS 485

Terminal assignment SSI Synchronous Serial interface with 12pin plug

Signal:	0V	+U_B	+T	–T	+D	–D	ST	VR	A1	A2	A3	A4	Shield
Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Col.:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BL	

T: Clock signal
D: Data signal
ST: SET input. The current position value is stored as new zero position (or the actual value is set to the preset value when using the programmable version).

VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.

PH: Plug housing

Insulate unused outputs before initial start-up.

A1, A2, A3, A4: outputs programmable by factory

Terminal assignment RS 485 and 12pin plug

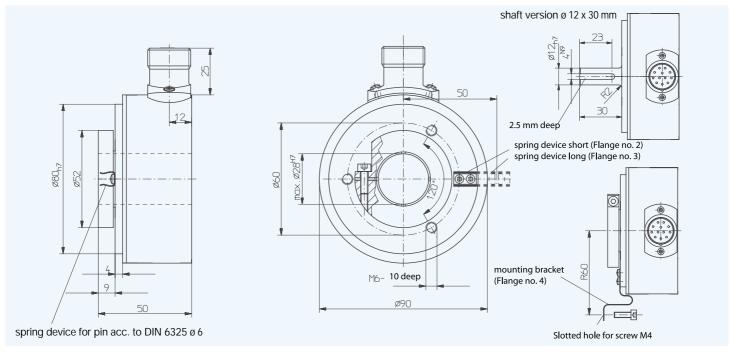| Signal:	0V	+U_B	T/R-	T/R+				VR					Shield
Pin:	1	2	3	4	5	6	7*	8	9	10	11	12	PH
Col.:	WH	BN	GN	YE				RD					

R: Receive-channel
T: Transmit-channel

VR: Up/down input. As long as this input (High-Level = +U_B) is active, decreasing code values are transmitted when shaft turning clockwise.

PH: Plug housing

*There is no set input for P3001 version, but it can be realised

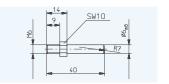### SSI interface with incremental track (A, B):

Signal:	0 V	+U_B	Clock+	Clock-	Data+	Data-	Set 0	VR	$\bar{B}$	B	$\bar{A}$	A	Shield
Pin:	1	2	3	4	5	6	7*	8	9	10	11	12	PH

Dimensions:

shaft version ø 12 x 30 mm

2.5 mm deep

spring device short (Flange no. 2)
spring device long (Flange no. 3)

mounting bracket (Flange no. 4)

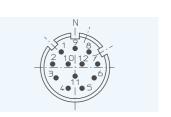Slotted hole for screw M4

spring device for pin acc. to DIN 6325 ø 6

Mounting advice:
1) Do not connect encoder and drive rigidly to one another at shafts and flanges!
2) Delivery includes a corresponding cylin-dric pin (see drawing), when the encoder is ordered with flange type 2 (short spring device) or type 3 (long spring device).

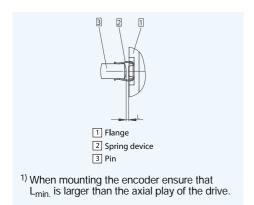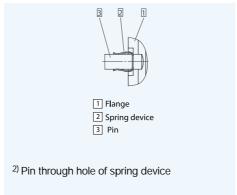### Top view of mating connector, male contact base:
12 pin plug

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MultiturnType BAMH 90 SSI or RS 485

Max. permissible drive shaft impact:

Type of flange:	Permissible axial impact	Permissible radial play	Permissible angular play
Flange type 2 (short spring device):	max. ±1 mm[1]	max. ±0.3 mm	max. ±2°
Flange type 3 (long spring device):	∞[2]	max. ±0.3 mm	max. ±2°
Flange type 4 (mounting bracket):	max. ±0.5 mm	max. ±0.3 mm	max. ±2°

1 Flange
2 Spring device
3 Pin

[1] When mounting the encoder ensure that $L_{min.}$ is larger than the axial play of the drive.

1 Flange
2 Spring device
3 Pin

[2] Pin through hole of spring device

ORDERING CODE Multiturn BAMH 90

BAMH 90

Flange
1 = without mounting aid
2 = with short spring device
3 = with long spring device
4 = with mounting bracket

Shaft Ø
12 = hollow shaft ø 12 mm
15 = hollow shaft ø 15 mm
20 = hollow shaft ø 20 mm
21 = hollow shaft ø 24 mm
28 = hollow shaft ø 28 mm

BAMS 90x12 = shaft ø 12 x 30 mm

Interface and supply voltage
2 = SSI, 5 ... 30 V DC
3 = RS 485, half-duplex 5 ... 30 V DC internal termination
5 = SSI, 5 ... 30 V DC, with incremental track 2048 ppr (A, B)
7 = RS 485 halfduplex 5 ... 30 V DC external termination
8 = RS 485-Interface, halfduplex-mode
9 = ESC-protocol max. 38400 baud

Connection
6R = 12 pin plug without mating connector

Code
G = Gray
B = Binary

SSI-Interface
1212 = 4096 x 4096 (24-Bit)
1312 = 8192 x 4096 (25-Bit)